



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-187

Proposal Title: Commercialized Pollinators: A Risk to Native Minnesota Bees?

Project Manager Information

Name: Melinda Wilkins

Organization: U of MN - College of Veterinary Medicine

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Project Basic Information

Project Summary: Assesses disease threats to MN native bees posed by imported commercialized solitary bees, support native pollinator populations, and promote best practices to protect the health of MN native bee populations.

ENRTF Funds Requested: \$999,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

Project Location

What is the best scale for describing where your work will take place?

Region(s): Metro

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

With the recent health challenges faced by commercial honey beekeepers and the struggle to provide adequate pollinator services for their clients, focus has expanded to include commercial production of alternate pollinator species including bumblebees, mason, and leafcutter bees. These commercial mason and leafcutter bees are available for purchase and are shipped into Minnesota from predominantly western US states and Canada by the hundreds to ten thousands (per acre). The imported species are not specifically native to MN and have the potential to alter the delicate balance of Minnesota's native bee populations. In Minnesota, we have 21 mason and 24 leafcutter native bee species. Similar to most animal species, crowding can increase the risk of pathogen transmission within and between species. Using poultry, livestock and honeybees as examples, humans attempt to control pathogens by using antibiotics to treat disease, chemicals to control parasites and selection for genetic resistance. Commercially produced bumble bees have been shown to be a source of pathogen introduction into wild bumblebee populations. While current commercial solitary bee production techniques are known to create problems with pathogens and parasites, little is known about the impact of commercialization on the population and health status of native solitary bees.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Compared to honey bees, the solitary nesting habits, shorter lifespan and shorter foraging distances of solitary bees make rapid and widespread disease outbreaks less likely but little viral or microbial research in this area is available. Solitary bees are between 100 to 200 times more effective pollinators than honey bees. Developing healthy, Minnesota native, naturally occurring bee-based pollinator populations will reduce the threat to our wild native bee populations while still providing the pollination services needed by orchardists and gardeners in Minnesota.

Activity 1 focuses on assessing the risk of importing pathogens and parasites from commercialized solitary bees and the risk of disease transmission from managing bees in backyard bee houses. Activity 2 focuses on selecting developing best practices to support native bee pollinator populations. Activity 3 focuses on understanding the volume and frequency of importation of commercialized bees and the risk of poorly managed bee houses. In addition, we will promote local bee populations as an alternative to importation, distribute best practice guidelines for backyard and orchard bee house management and suggest regulatory actions for state officials to mitigate the risks posed by importation of commercialized solitary pollinators.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

We need pollinators to produce food crops and beautiful gardens. Without alternatives, people will keep importing non-native commercially produced solitary bees to supplement honeybee pollinators. We will quantify the volume and risk posed by current solitary bee importation practices, use this information to develop regulations to restrict or block importation if needed to protect native MN pollinators. We will select and support native bee populations for use as alternate pollinators, develop management guidelines to support native pollinators for orchardists and distribute best practices for garden bee house keepers to keep our native bees healthy and disease free.

Activities and Milestones

Activity 1: Objective: Measure health status of Genus Osmia and Megachile bees at numerous sites in the Twin Cities Metropolitan (TCM) area.

Activity Budget: \$500,000

Activity Description:

Tasks:

1. Place 2-4 empty bee houses at 10 pollinator friendly sites around the TCM area. Half the houses will contain “large” diameter phragmites reeds (~8 mm diameter) and the other half will contain “small” (~6 ml) diameter reeds.
2. Collect (with nets) and analyze 5 Osmia and 5 Megachile bees from 8-12 sites around the TC (total of 50 bees of each species) where these bee populations are known to be robust, based on prior work completed by Dr. Cariveau’s Native bee lab and the Minnesota Bee Atlas produced by Minnesota Department of Natural Resources and the UMN insect collection.
3. Using a subset of the collected bees, analyze the bee microbiome, viromes and morphometric data for each species and subspecies of two genus of native bees: leafcutter bees (Genus Megachile) and mason bees (Genus Osmia). External parasites and predators from the sites, as well as exact reed diameter will be identified and quantified as well in Yr 2 & 3.
4. Collect the same data as above for Osmia and Megachile bees obtained from 10 commercial sources located outside MN.

Outcomes: Compare the health/disease status of wild caught, local bee house managed, and imported commercial solitary bees.

Activity Milestones:

Description	Approximate Completion Date
Obtain permissions and place bee houses, repeat in yr 2 and yr 3	April 30, 2026
Collect wild bees, repeat in yr 2 and yr 3	June 30, 2028
Complete molecular and microbiological analysis, repeat in yr 2 and 3	June 30, 2028
Complete morphological and parasitic analysis, repeat in yr 2 and 3	June 30, 2028
Compare health/disease status of locally managed bees to wild caught and commercially purchased bees	March 31, 2029

Activity 2: Select four species of native bees, evaluate for robustness and population growth potential: support their propagation in various settings.

Activity Budget: \$300,000

Activity Description:

Tasks:

1. Select the four most promising native species (2 mason, 2 leafcutter) factoring in health, reproduction and survival rates, to continue supporting population growth.
2. Determine preferred reed diameter for each native bee species selected.
3. Test different over-wintering methods to maximize reproductive and winter survival rates.
4. Support the natural propagation of the selected leafcutter and mason bee species in both laboratory and field settings (orchard and garden).
5. Determine feasibility of maintaining these species in a controlled setting for conservation purposes (insurance

against climate change).

Objectives: To reduce the importation of non-native commercialized bees, alternatives pollinators will need to be made available. The selection and support of robust native pollinator species that are easy to house and maintain will reduce the need for importation. Mason bees are early season pollinators (good for fruit trees) and leafcutter bees are mid summer pollinators (good for backyard gardens).

Activity Milestones:

Description	Approximate Completion Date
Select promising native species to support further propagation	March 31, 2027
Determine preferred reed diameter for each selected species	March 31, 2027
Test overwintering parameters to maximize reproductive and survival rates (repeat in yr 2 & 3)	March 31, 2028
Support natural propagation of selected bees in laboratory and field settings (yr 2 & 3)	October 31, 2028
Determine feasibility of maintaining species in controlled setting for conservation purposes	March 31, 2029

Activity 3: Quantify the volume, type, source and use of commercial solitary bees in MN, propose restrictions/regulations regarding importation into Minnesota

Activity Budget: \$199,000

Activity Description:

Tasks:

1. Survey gardeners, orchardists in MN to assess use of imported commercial solitary bees (frequency, volume, type and source of bees purchased)
2. Six bee houses from Activity 1, Task 1 will be left unmanaged. Re-used reeds from each house will be tested for bacteria, viruses, fungi and parasites at the end of winter for (Yrs 2-3) to determine if there is an accumulation of pathogens in reused nesting materials.
3. Develop best management and health practices guidelines for maintaining the selected MN Native Pollinator populations in backyard garden and food crop settings.
4. Promote these practices within the garden communities and food crop associations (targeting groups likely to purchase commercially produced bees).
5. Provide solitary bee importation guidelines to MN state regulators - based on research generated by this project.

Objectives: Based on the native bees selected in Activity 2, develop simple but effective management guidelines for both orchardists and backyard gardeners to encourage the support of local native pollinators (vs. imported commercial pollinators). Suggested restrictions/regulations will be provided to appropriate MN regulators based on the outcome of research conducted in Activities 1-3 of this project.

Activity Milestones:

Description	Approximate Completion Date
Complete surveys and summarize data collected	June 30, 2026
Rest re-used reeds in yr 2 and 3 for pathogens and pests	December 31, 2028
Develop best management practice guidelines for maintaining healthy native bee populations in yards and orchards	December 31, 2028
Promote the guidelines within gardener and orchardist communities.	March 31, 2029
Provide suggested solitary bee importation restrictions/regulation to MN state regulators	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Declan Schroeder	Pathogen Detection and Surveillance, College of Veterinary Medicine, UMN	Co- PI, The Schroeder Virology laboratory will complete the bee and nest material sample preparation and the virome and microbiome testing.	Yes
Elaine Evans	Assistant Extension Professor, Extension Educator, Researcher, Department of Entomology	Co-I, Dr. Evans will advise on the project and complete the morphological evaluation of the bees.	Yes
Jessica Helgan	Bee Researcher and Bee Squad Program Director, Department of Entomology, UMN	Collaborator, Dr. Helgan and her Bee Squad team will be responsible for locating and netting the wild caught bees in this project.	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

The Bee Lab (UMN) has an active Extension and Outreach program that will continue to disseminate results after program completion. Funds from this project will build on and extend the impact of ENRTF projects in Minnesota, greatly expanding the scope of this project as well as past and future ENRTF projects. Based on all activities, suggest regulations/restrictions for the State of Minnesota related to the importation of commercially produced and/or non-native solitary bees – designed to protect native bee populations from invasive pollinator competition and/or pathogens.

Project Manager and Organization Qualifications

Project Manager Name: Melinda Wilkins

Job Title: Associate Professor - Public Health Veterinarian

Provide description of the project manager’s qualifications to manage the proposed project.

Dr. Wilkins (DVM, MPH, PhD) is an Associate Professor with the College of Veterinary Medicine, UMN. She has held numerous managerial positions over the last 30 years including Section Manager then Division Director with the Michigan Department of Community Health (budget of ~11 Million, staff size 70). This role included managing several multi-year grants and federal cooperative agreements. Management positions within an academic setting including Manager of the MS in Food Safety Graduate Program and Interim Department Chair (13 mos), Large Animal Clinical Sciences, Michigan State University. Both academic management positions required working with numerous (often cantankerous) faculty, as well as researchers and staff. Besides working with faculty and staff, Dr. Wilkins routinely

works with undergraduate, graduate and professional students including leading five study abroad trips. Starting at UMN in 2022, she recently took on the role as Director of the Veterinary Public Health and Preventive Medicine Residency program for the College of Veterinary Medicine, UMN. Every managerial role requires juggling people, budgets, multiple outcomes, tight timelines and project reporting. Clearly communicating expectations and timelines is critical for successfully meeting objectives and reporting deadlines. Invariable, challenges and barriers will arise, and Dr. Wilkins will use sound scientific principles to address each issue. Dr. Wilkins has supervised a dozen PhD students, over 100 MS students and over 40 MPH students. Dr. Wilkins has experience keeping honey bees and mason bees. She is faculty advisor for the Bee Club at the CVM and is incorporating Bee Medicine topics into her veterinary courses. Her research has focused on infectious disease surveillance, foodborne illness and other disease outbreaks, and disease spillover from one species to another.

Organization: U of MN - College of Veterinary Medicine

Organization Description:

The University of Minnesota (UMN) is the state's land-grant university and one of the most prestigious public research universities in the nation. It was founded in the belief that all people are enriched by understanding; is dedicated to the advancement of learning and the search for truth; to the sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation, and the world. Established in 1947, the University of Minnesota College of Veterinary Medicine is Minnesota's only veterinary college. Fully accredited, the college has graduated nearly 4,000 veterinarians and hundreds of scientists. The college is also home to the Veterinary Medical Center, the Veterinary Diagnostic Laboratory, the Leatherdale Equine Center and The Raptor Center. The college embraces the "One Health" concept, which aims to transform new knowledge into better health for animals, people, and the environment. The college also plays an important role in the health of the community by assuring food safety, conducting biomedical research, preventing zoonotic diseases, and enhancing our physical and psychological well-being through the care of companion animals and the protection of Minnesota's wildlife natural resources.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Melinda Wilkins		PI			37.1%	0.48		\$124,906
Declan Schroeder		Co-PI			37.1%	0.48		\$108,352
Elaine Evans		Co-I			37.1%	0.3		\$33,101
Jessica Helgan		Researcher			33%	0.8		\$81,360
2 Bee Squad Members		Researchers			33%	1.14		\$95,634
2 Post Docs		Post Docs			27%	5		\$374,670
Undergraduate student		Undergraduate student			0%	0.28		\$9,414
Thea Evans		Researcher/Advisor			33%	0.15		\$9,296
							Sub Total	\$836,733
Contracts and Services								
Bee Taxonomist (TBD)	Professional or Technical Service Contract	Identification of bees to the genus, species and sub species level - fee is per bee identified				-		\$3,600
							Sub Total	\$3,600
Equipment, Tools, and Supplies								
	Equipment	GridION	Equipment needed to run molecular analysis of samples					\$30,000
	Tools and Supplies	Nets, tubes, specimen preservation	Sample collection in field					\$15,000
	Tools and Supplies	Pathogen screening molecular consumables (nucleic acid extraction, molecular grade chemicals, RT-PCR, NGS sequencing)	Chemicals needed to prepare samples for testing					\$36,800
	Tools and Supplies	Test kits and primers	Primer kits specific to genetic material from bees					\$8,600

	Tools and Supplies	Field data collection - 2 tablets	Field data collection tool used to document GPS location, photograph and complete field info form.					\$5,000
	Equipment	2 temperature and humidity controlled refridgerators	To store bee coccoons over-winter					\$9,000
	Tools and Supplies	Bee houses (65), paint, mounting poles and hardware fasteners	To capture and manage bees, determine nesting preferences, and bioaccumulation of pathogens in bee houses					\$6,500
	Tools and Supplies	Bee nesting reeds (2000), brushes (2) and disinfectant (2 gallons)	To restock the bee houses each summer with fresh reeds for bee housing					\$3,300
	Tools and Supplies	Bee net cages (20), pollen and nectar feed supplies, lights, light table, calipers and portable heater.	To propogate selected species of native bees in lab setting and transport to field setting					\$11,687
							Sub Total	\$125,887
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	24 trips to capture bees each year for 3 years, 24 trips to place and monitor bee houses each year for 3 years, using UMN pool cars, local travel ~\$50 per trip, all in the Twin Cities metropolitan area. In year 4 we anticipate 28 trips to orchard sites for bee propagation studies, within 100 miles of the campus, using UMN pool cars, ~ \$115 per trip.	To collect wild bees, maintain bee houses, field test propogated species in the field					\$10,780
							Sub Total	\$10,780
Travel Outside Minnesota								
							Sub Total	-

Printing and Publication								
	Publication	We anticipate several peer-review publications to be generated. We prefer using open source journal which have significant publication fees.	Diseminate research findings					\$6,000
							Sub Total	\$6,000
Other Expenses								
		Use of bee management and rearing space at the CVM	Space necessary for bee houses, reeds and cocoon management in the offseason, and the selected bee species will be overwintered and raised in net cages in this space at the CVM. The two cocoon refridgerators will also be placed here.					\$16,000
							Sub Total	\$16,000
							Grand Total	\$999,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Total Project Cost: \$999,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [fd2d1853-3cf.pdf](#)

Alternate Text for Visual Component

Graphic shows pictures of two types of solitary bees, three flags with arrows implying the movement of bees from CA, OR and CA into MN, A problem statement box, and solution statement box and three ways to address the problem, one in each cog of a mechanism....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Letter of Institutional Approval for Submission, UMN SPA	622044bd-435.pdf
Secretary of State Good Standing	1514ca8d-905.pdf
UMN Board Reivewed Financial Statements	cb637b46-4fd.pdf
UMN Annual Audit 2023	9d489269-623.pdf
UMN Tax Exemption Letter	92577ef0-937.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Ellis Mosier, Pre-award Specialist, College of Veterinary Medicine, UMN

